

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 9

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN E. HERMAN

Appeal No. 1997-1461
Application 08/388,915¹

ON BRIEF

Before DOWNEY, HANLON and WALTZ, Administrative Patent Judges.

DOWNEY, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-7 and 9-11. Claim 8 has been objected to by the examiner as dependent on a rejected claim.

The subject matter on appeal is directed to a process of recovering particulate silicon from a liquid by-product

¹ Application for patent filed February 15, 1995.

stream.

Claim 1 is illustrative and reads as follows:

1. Method for recovering particulate silicon from a liquid by-product stream, the method comprising:

(A) substantially separately a liquid stream comprising particulate silicon, a metal salt, and a high-boiling silicon containing compound having a boiling point higher than the sublimation temperature of the metal salt, into a liquid component and a particulate component where the particulate component comprises the particulate silicon, the metal salt, and residual high-boiling silicon containing compound;

(B) washing the particulate component with a solvent having a boiling point lower than the sublimation temperature of the metal salt, thereby essentially separating the residual high-boiling silicon containing compound from the particulate component, and

(C) recovering the particulate component by spray drying at a temperature lower than the sublimation temperature of the metal salt.

The references relied upon by the examiner are:

Kotval et al. (Kotval)	4,195,067	Mar. 25,
1980		
Ritzer et al. (Ritzer)	4,892,694	Jan. 9,
1990		
Burgie et al. (Burgie)	5,118,486	Jun. 2,
1992		
Chadwick et al. (Chadwick)	5,326,896	Jul. 5,
1994		

Claims 1, 2, 4, 5 and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Chadwick and appellant's

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admissions concerning the teachings of Chadwick taken with Burgie and Ritzer. Claims 3, 6, 7, 10 and 11 stand rejected under 35 U.S.C. § 103 as being unpatentable over the above references and further in view of Kotval.

We reverse.

The Patent and Trademark Office (PTO) has the initial burden under 35 U.S.C. § 103 of establishing a prima facie case of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992), In re Passaic, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). In determining the propriety of the PTO case for obviousness in the first instance, it is necessary to ascertain whether or not the reference(s) teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination or modification. In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

It is well known to react an organohalide with a silicon metalloid in the presence of a suitable catalyst to form monosilanes (Chadwick, column 1, lines 27-30). This process is referred to as the "Direct Process." Id. This process, in

addition to forming monosilanes, produces a high-boiling component which can constitute as much as ten percent of the resultant product (Chadwick, column 1, lines 64-69). The high boiling component is a complex mixture that include, silicon containing compounds, silicon particulate and soluble and insoluble compounds of copper, aluminum and zinc (Chadwick, column 1, lines 48-60). The Chadwick invention is directed to a process of converting the high boiling component to monosilanes by contacting the high boiling component with a hydrogen gas at a temperature of 250-1000°C.

Burgie is directed to a process for separating particulate silicon from a liquid or liquid by-product stream containing silanes by atomizing into a heated zone the silane containing liquid to dry the silicon particulate.

Ritzer is directed to a process of rendering the high boiling component, a component that is highly reactive and exothermic upon exposure to moisture, stable to permit transportation and disposal of the component. Ritzer deactivates the high boiling component by pelletizing the high boiling component and impregnating the pellets with a binder that may applied in solution or emulsion. The solvent or

emulsion carrier is identified as either an organic solvent or water. Ritzer indicates that when the solvent for the binder is water, it is used in large amounts and serves as a carrier for the binder and as a heat transfer fluid to quench the heat of reaction.

Kotval is directed to a process for the production of silicon materials with reduced aluminum impurity levels, useful for solar panel applications. In order to reduce the impurities in silicon materials, Kotval teaches that it is known to treat silicon materials with silicon tetrachloride to reduce the aluminum content (see column 2, lines 40-45).

Whereas Chadwick seeks to convert the high boiling component to monosilanes, appellant seeks to recover the silicon particulate from the high boiling component by (A) initially separating the liquid and particulate components; (B) washing the particulate component with a solvent having a boiling point lower than the sublimation temperature of the metal salt to separate the high-boiling silicon containing compound(s); and then (C) spray drying the particulate component (our emphasis).

In order to establish a prima face case of obviousness,

the examiner relies upon Chadwick for step A, Burgie for step C, and Ritzer and Kotval for step B. The examiner alleges that Ritzer shows "washing" at column 2, lines 33-42, when Ritzer contacts Si with copious amounts of solvent, that is, when the pellets are contacted with an aqueous binder solution and that Kotval shows "washing when he contacts silicon with silicon tetrachloride" (column 2, lines 40-45). The examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to "wash" the high boiling component of Chadwick as taught by Ritzer and by Kotval and then to spray dry as taught by Burgie.

In our view, the examiner has not sustained his burden to establish that the claims would have been obvious at the time the invention was made from the combined teachings of the cited prior art.

The statutory standard of § 103 for determining obviousness of an invention is whether in view of the prior art the invention as a whole would have been obvious at the time it was made. Oetiker, 977 F.2d at 1444, 24 USPQ2d at 1444. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention,

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absent some teaching or suggestion supporting the combination. ACS Hosp. Sys. Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). In the situation before us, the examiner has pointed to isolated teachings in each of the applied references. The examiner has not adequately explained why one of ordinary skill in the art at the time the invention was made would have found it obvious to modify the teachings of Chadwick in the manner suggested and why one of ordinary skill in this art would have found it obvious to combine the teachings of Chadwick, Burgie, Ritzer and Kotval in the manner suggested. The examiner's approach falls short of establishing the requisite evidence to establish that one of ordinary skill would have found it obvious to combine the applied references to arrive at the claimed invention. Grain Processing Corp. v. American Maize-Prods. Co., 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988)

REVERSED

MARY F. DOWNEY

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Administrative Patent Judge)	
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)	BOARD OF PATENT
ADRIENE LEPIANE HANLON)	
Administrative Patent Judge)	APPEALS AND
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)	INTERFERENCES
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THOMAS A. WALTZ)	
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